

resin flow paths 70x and the pass-through holes serving as the resin flow paths 70y may be used.

[0041] After the cull plates 70a, 70b are placed, the sealing resin 9 in the resin pot 41 is poured into the resin flow paths 70x, 70y communicably connecting the resin pot 41 and the magnet housing holes 5x, 5y, whereby the sealing resin is injected into the magnet housing holes 5x, 5y (see FIG. 7A). Specifically, after the pellets P are supplied into the resin pot 41, the plunger 42 is fitted into the resin pot 41, as illustrated in FIG. 8. The pellets P are then heated by a heater (not illustrated) provided internal to the upper mold 40, and are allowed to melt. By pushing the plunger 42 downwardly after the pellets P melts in the resin pot 41, but before the thermal hardening takes place completely, the sealing resin 9 is injected into the magnet housing holes 5x, 5y via the resin flow paths 70y in the cull plate 70b and the resin flow paths 70x in the cull plate 70a (see FIGS. 7A and 8). From the view of improving the throughput, the time for injecting the sealing resin 9 is approximately 15 seconds to 30 seconds, although the time depends on the size of the magnet housing holes.

[0042] As illustrated in FIG. 8, the resin flow path 70x positioned radially outside, among the two resin flow paths 70x provided per one magnet housing hole 5x (or one magnet housing hole 5y), is positioned at an area offset from the area of the resin pot 41 in the plan view. At this point, the resin flow path 70y in the cull plate 70b, which is placed on the cull plate 70a, has the base-end portion 70r extending internally and positioned immediately below the resin pot 41, and the tip portions 70p continuing to the base-end portion 70r and surrounding the external perimeter of the corresponding resin flow path 70x. This configuration can ensure the sealing resin 9 flowing out from the resin pot 41 to reach the resin flow path 70x positioned radially outside via the base-end portion 70r and the tip portions 70p of the resin flow paths 70y. The above description gives the details of the step (B).

[0043] Subsequently to the step (B), the sealing resin 9 is injected into the magnet housing hole 5z that is provided interposed between the magnet housing holes 5x, 5y at each pole, with the magnet 7 being disposed in the magnet housing hole 5z (step (C)). The step (C) will now be explained in detail with reference to FIGS. 5C, 6C, 7B, and 9. For the convenience of the explanation, the magnet housing holes 5x, 5y are not illustrated in FIG. 6C, among the magnet housing holes 5x, 5y, 5z, and only the magnet housing hole 5z is illustrated.

[0044] At the step (C), to begin with, the cull plates 70a, 70b interposed between the upper mold 40 and the lamination 10 are removed. There are some unnecessary resin members remaining on the surfaces of the cull plates 70a, 70b and having attached when the sealing resin 9 is injected into the magnet housing holes 5x, 5y. By removing the cull plates 70a, 70b, such unnecessary resin members can be removed with the cull plates 70a, 70b from the lamination 10. A cull plate 70c (second plate) is then placed between the upper mold 40 and the lamination 10 (see FIG. 7B). In other words, the cull plate 70c is placed on the top surface 10a of the lamination 10 (see FIG. 6C).

[0045] As illustrated in see FIG. 5C, the cull plate 70c is provided with a plurality of pass-through holes passing through the cull plate 70c in the thickness direction. These pass-through holes serve as resin flow paths 70z communicably connecting with the magnet housing hole 5z when the

cull plate 70c is placed on the lamination 10 (see FIG. 6C). Each of the resin flow paths 70z forms a second resin flow path communicably connecting the corresponding resin pot 41 and magnet housing hole 5z. Each of the resin flow paths 70z have a substantially circular shape in the plan view (see FIG. 5C), and one resin flow path 70z is provided for one magnet housing hole 5z (see FIG. 6C).

[0046] After the cull plate 70c is placed, by pouring the sealing resin 9 in the resin pot 41 is poured into the resin flow path 70z communicably connecting the resin pot 41 and the magnet housing hole 5z, whereby the sealing resin is injected into the magnet housing hole 5z (see FIG. 7B). Specifically, after the new pellets P are filled in the resin pot 41, the pellets P are heated by the heater (not illustrated) provided internal to the upper mold 40, and caused to melt. By pushing the plunger 42 downwardly after the pellets P melt in the resin pot 41, but before the thermal hardening takes place completely, the sealing resin 9 is injected into the magnet housing holes 5z, via the resin flow paths 70z in the cull plate 70c (see FIGS. 7B and 9). Among the steps of injecting the resin, the process of filling the new pellets P may be performed at the beginning of the step (C). The above description gives the details of the step (C).

[0047] The sealing resin 9 having been injected into the magnet housing holes 5x, 5y, 5z at the step (B) and the step (C) is hardened by heat (step (D)). Specifically, by applying heat to the lamination 10 by a heater (not illustrated) provided to the resin sealing device 50, the thermal hardening of the sealing resin 9 injected into the magnet housing holes 5x, 5y, 5z (thermosetting resin) is promoted. The temperature for heating the thermosetting resin at the step (D) depends on the type of the thermosetting resin, but is preferably 150 to 180 degrees Celsius or so. From the view of improving the throughput, the time spent for the step (D) is preferably 40 to 60 seconds or so. Finally, extra resin pieces are removed, the surface of the lamination 10 is finished, for example, and the laminated core R making up the rotor is completed.

[0048] Operational advantages achieved by the method of manufacturing the laminated core R will now be described.

[0049] For example, as illustrated in FIG. 10, in a manufacturing method according to a comparative example, the lamination 10 deforms. More specifically, the magnet housing holes 5x, 5y, 5z and the external surface 10o of the lamination 10 go through a deformation. In this manufacturing method according to the comparative example, at one of the steps of injecting the sealing resin 9, the sealing resin 9 is injected into the magnet housing hole 5x and the magnet housing hole 5z, instead of the magnet housing holes 5x, 5y that are arranged at symmetrical positions. In other words, the sealing resin 9 is simultaneously injected (at the same step) into the magnet housing holes in the area decentered in the circumferential direction (magnet housing holes 5x, 5z), at each pole. Therefore, the injection load is applied to the unbalanced area at each pole, so that the internal stress becomes unbalanced. As a result, the magnet housing holes 5x, 5y, 5z and the external surface 10o of the lamination 10 are deformed. The deformations of the shapes of the magnet housing holes 5x, 5y, 5z and the external surface 10o become more prominent because the magnet housing holes 5x, 5y, 5z are arranged near the outer circumference 10c of the lamination 10, and the thickness between the magnet housing holes 5x, 5y, 5z and the outer circumference 10c is thin. In FIG. 10, the dotted lines presenting the shapes of the magnet